

EXECUTIVE SUMMARY

The National Science Foundation's (NSF's) Division of Science Resources Studies (SRS) contracted with SRI International's Science and Technology Policy Program to undertake a project entitled *The Application and Implications of Information Technologies in the Home: Where Are The Data and What Do They Say?* The objective of the project was to develop a consolidated information base on the role of information technologies (IT) in the home for use by NSF, SRS, and the larger research and policy communities. The resulting information base consists of three main components:

- An inventory of U.S. national datasets containing data on the use and consequences of IT in the home, with accompanying annotations of each dataset.
- An annotated bibliography of principal articles, books, and reports that present research about or analyses of the use and implications of IT in the home.
- An integrated overview and assessment of the current state of knowledge and evidence concerning the use and consequences of IT in the household sector.

Our current knowledge about the status and impact of IT in the home comes largely from scholarly studies that generate original data and from policy analyses of the existing national datasets related to home IT. What we know may be briefly summarized as follows.

ACCESS TO HOME IT

- In 1998, approximately 42 percent of American households owned a personal computer (PC), and one-quarter of American households had access to the Internet. The diffusion of home computers grew faster from 1994–98 than in any period since 1984.
- The patterns of IT diffusion and adoption clearly suggest that IT is still very much a resource acquired by more affluent and well-educated Americans. Although PCs have been diffusing rapidly in recent years, rates of adoption are still much lower in poor and minority households compared to affluent and white homes.

- The research for both PC and Internet adoption indicates that socioeconomic factors (such as income, level of education, and marital status) and demographic factors (such as age, sex, and ethnicity) continue to be the primary predictors of home IT access.
- Very simply, income allows families to hurdle affordability barriers to adoption, and well-educated individuals are more likely to be aware of and appreciate the ways IT can be used in the home.
- Racial/ethnic disparities in home access to IT typically cannot be explained by income or level of education alone. There are deeper cultural and social factors influencing the adoption process, but these factors have not been empirically identified or isolated.

HOME IT USE

- The recent wave of home computer adoption has gone largely unexamined by scholars and analysts; our empirical knowledge of home computing dates from the early to mid-1980s. This early adopter research suggests that the primary use of home computing was for education, play, work, and basic word processing. Sizable proportions of early adopters found that they used the computer less than they had initially expected, and, in one long-term study, nearly one-fifth of families had quit using their PC entirely within 2 years. It is not clear whether this under-utilization was due to the inability of the technology to meet needs within the family, the relative lack of quality software for the early computers, or other factors.
- Early-adopter findings generally suggest that children tended to use home PCs more often and for longer periods than adults. Strong differences by sex also appeared in some studies. Women and girls overall appeared to use the computer less often and less intensively than their male counterparts, and were much less likely to be heavy users of the technology. Children tended to use the computer for games, learning, and writing in roughly balanced proportions—no one application dominated use, although game playing was the most common reason children gave for using the computer.

- Recent research on Internet use reinforces some of the impressions generated by the early computing studies: children and male teenagers still tend to be the heaviest users of IT.
- The Internet has made a new form of interpersonal communication available, and several analyses suggest that e-mail and communication drive use of the Internet by individuals and households.
- Specific informational content derived from the World Wide Web is relatively unique to each individual's interests and needs, but broad patterns of information use emerge. Americans most often seek information related to health and leisure. Affluent and educated individuals also use the Internet for work, while socioeconomically disadvantaged groups use the Internet to seek jobs and take classes.

HOME IT IMPACTS

- Research on the actual impacts of IT on home, family, and individual household members is *extremely limited in scale and scope*. The areas of impact covered include (1) time displacement studies, (2) the impacts of teleworking on the home, (3) psychological well-being, (4) informatics and healthcare, and (5) the impact of video games on children. A general theme of the impact research is the dual nature of home IT—it can be both beneficial and harmful.
- Home computing and Internet use do not yet appear to displace other forms of home media and entertainment (reading, watching television, listening to the radio) substantially. While there does appear to be some slight displacement of television viewing, several analysts suggest that PCs and the Internet are media enhancing: people begin to use other forms of media more often as they become more acquisitive of information.
- The research on teleworking generally predates major changes in distributed work arrangements in large-scale organizations, so the findings may have limited applicability to the contemporary workplace. Studies indicate that telework can demonstrably enhance people's ability to better balance work and family needs and reduce per-

sonal stress. On the other hand, telework can also disrupt important family dynamics and relationships and create psychological isolation and low self-esteem. Most research on telework/distributed work focuses on efficiency and productivity, and not on the impacts on individual workers or their homes.

- With respect to psychological well-being, there is mixed evidence regarding the impact of computing on individuals. Some data suggest that increasing Internet use is associated with social isolation, withdrawal, and stress—although Internet “addiction” may be limited to about 10 percent of Internet users and isn't necessarily associated with how much time an individual spends on the “Net.” Conversely, some studies suggest that Internet use enhances family connectedness and friendship formation.
- Patient health informatics are an emerging class of tools designed to help individuals understand their medical conditions and more effectively participate in decisions about treatment and care. The limited research on home health informatics suggests that patients who used these tools had higher levels of understanding about their medical conditions and treatment choices compared to those who did not.
- The impact of video games on children may provide insight into the impact of computer games on children. Evidence is found for both positive and negative behaviors associated with the use of video games, but also for neutral outcomes. For example, video game playing does not necessarily make children less sociable, and these games appear to be more intellectually challenging and stimulating than television on several key empirical measures of both affect and stimulation. Of cause for concern is the strong preference of boys for more aggressive video games, and for these preferences to be associated with more aggressive behavior and reduced sociability.

AVAILABILITY AND UTILITY OF DATA ON IT IN THE HOME

Although data that address basic questions regarding home access to computing and the Internet are readily

available, our ability to analyze meaningfully the consequences of IT in the home is hampered by three crucial factors. First, there is a lack of data collection on the actual impacts of computer and Internet use on homes, families, and individual household members. Second, there is an absence of routine, detailed data collection on home computers and computing. Third, there is a bias toward proprietary (and costly) commercial databases with limited accessibility by the policymaking and scholarly communities. In addition:

- Relatively few data resources on IT in the home exist that meet standards of acceptable quality for policy or scholarly analysis. Only half a dozen survey efforts provide data obtained through valid sampling methods that are able to be generalized to large portions of U.S. households and that are for more than 1 year of activity.
- There is a data collection bias toward Internet access and use. Detailed information related to patterns of home computing are limited to two sources of data, the Bureau of the Census' Current Population Survey and the Pew Research Center for the People and the Press' Technology Survey. Neither survey is conducted on a regular basis. The ability to conduct meaningful trend analysis is consequently nonexistent.

The existing data do allow us to analyze some developments in the diffusion and adoption of home IT. The data address who has access to a computer—or the Internet—in the home, and by relatively detailed demographic and socioeconomic characteristics (for example, income, race, age, and level of education). We can also describe, in a basic way, how important some computing applications are relative to others (for example, word processing versus game playing). And we know, in a broad way, what people do on the Internet: use e-mail and search for information, particularly health-related content.

However, because of the limits to current data collection and resources, we cannot answer fundamental questions regarding the role and importance of IT in American homes. For example, how do families and individuals use information gained from the World Wide Web

and with what consequences? What are the outcomes of the growing role of e-mail in some families' lives? Are they any better off than families without e-mail? Do PCs meet a home's needs and desires, or will the recent rush to purchase computers lead to disappointment and abandonment by families with naive hopes for the technology and overly high expectations? Does the PC have any greater role and purpose as a family tool than it did 20 years ago? How does the presence of home computing affect family dynamics and relationships? Does it diminish or enhance quality of life, and under what circumstances? Are there pathologies associated with extensive Internet use? How does computer-based work at home affect the nature of home itself? How effective are families at managing the Information Age with home IT?

Because we cannot answer these fundamental questions, we cannot address whether the inequities that exist in access to home information technologies matter, and how. The implicit assumption is that the absence of IT in the home will perpetuate social and economic disadvantages. Individuals and families cannot build the computing skills needed for today's labor force; important educational resources cannot be availed; and information needs go unaddressed. Minorities, the "underclass," and other groups in American society have traditionally been "informationally disadvantaged"; these groups tend to have fewer lines of access to information, the quality and accuracy of their information are low, and their information networks are simply less enriching than those available to the rest of society. Those deprived of quality information suffer from compromised decision-making and problem solving related to their quality of life and well-being. Can home IT ameliorate these disadvantages? Will (or do) these groups compensate for lack of home IT access through other means, such as using IT resources at libraries and kiosks?

It is cliché to call for more surveys, more data collection, and more research. However, it is also clear that the data needed to answer fundamental questions about the impact of IT on the home are lacking. We simply do not know whether the presence of these technologies in the home "makes a difference," how, and whether it is worth the costs.

